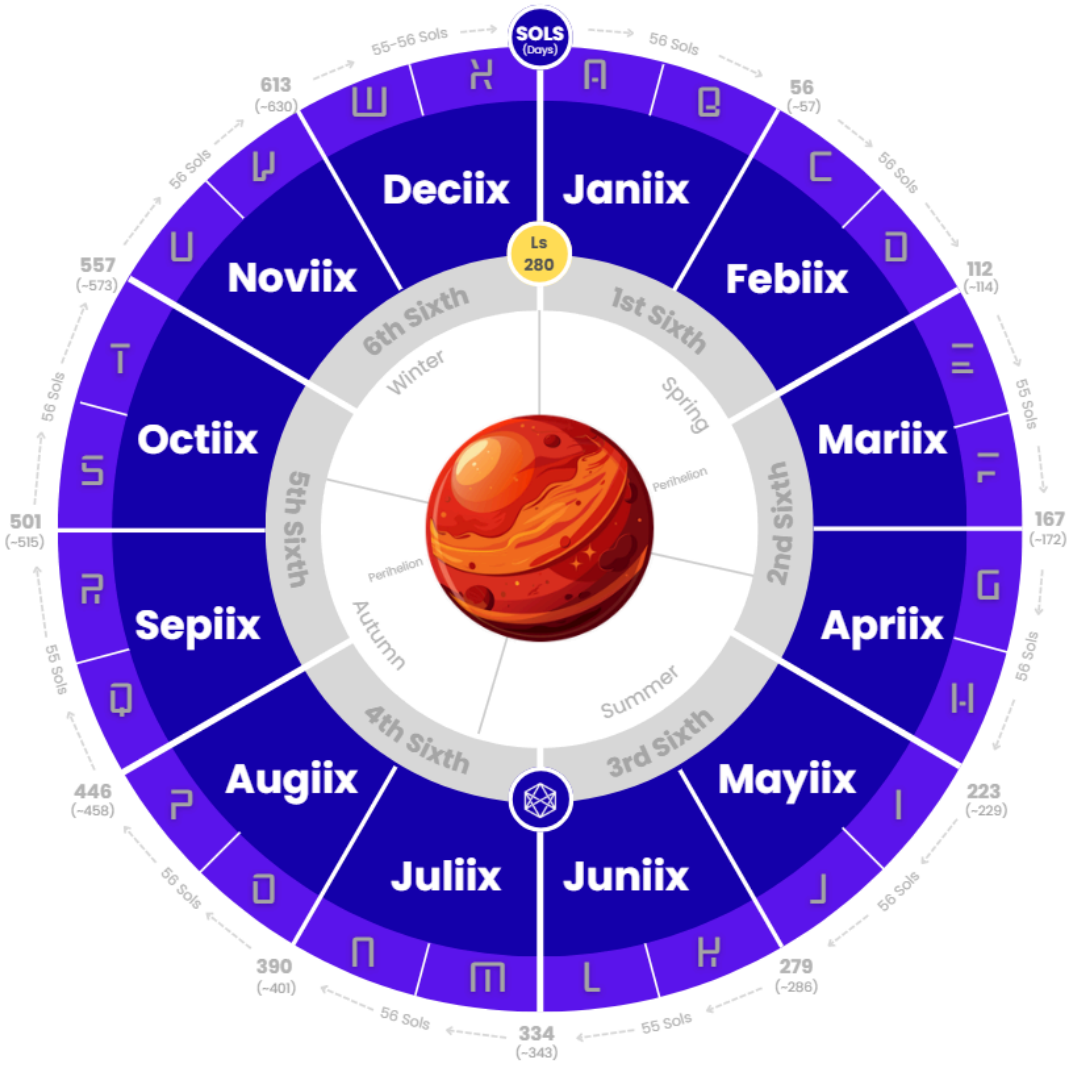
The Marian Calendar overview

Marian Calendar



The **Marian calendar** is the civil timekeeping system that was adopted for long-term human settlement on Mars during the first one hundred years of settlement. It preserves familiar Earth conventions (a seven-day week and a 12-month year) while aligning to Martian astronomy: the **solar day (*sol*)** and the **vernal-equinox (tropical) year**. The design emphasizes operational simplicity, cultural continuity, and seasonality that matches conditions on Mars.

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Design principles

- **Sol-centric**: The sol is the fundamental unit. One sol equals **24 h 39 m 35.244 s** of Earth time (≈ 88,775.244 s). For civil use the sol is divided into **24 hours × 60 minutes × 60 seconds**; each Marian second is **1.02749125** Earth seconds, preserving the familiar 24-hour clock while matching the Martian day length.
- **Astronomically anchored**: Years begin at **Ls 280°** (relative to northern vernal equinox) and track Mars's asymmetric seasons.
- **Human-practical**: Months and weeks are regular enough for planning, with stable holidays and minimal rule exceptions.
- **Epochal**: Year numbering uses the **Human Era (HE)**, with **Year 0 HE** defined as the year of first human landing on Mars; earlier dates are **Before Human Era (BHE)**.

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Units, reference meridian, and time zones

- **Prime meridian**: All civil time is referenced to **Airy-0** (Mars's prime meridian).
- **Standard time**: A Mars-wide reference to ATC (analogous to UTC) is maintained at Airy-0; with settlements adopting local zones in **~15° longitude** increments (≈ 1 Marian hour), with practical adjustments for operations.
- **Earth–Mars latency** (≈ 4–22 minutes one-way) is **not** part of civil timekeeping.

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Year length and seasonality

- **Tropical year**: **≈ 668.5907 sols** (≈ 686.9711 Earth days).
- **Season lengths** (northern hemisphere, rounded): **Spring 193 sols; Summer 179 sols; Autumn 143 sols; Winter 154 sols**. The asymmetry reflects Mars's orbital eccentricity (southern summers are shorter and warmer; northern summers longer and cooler).

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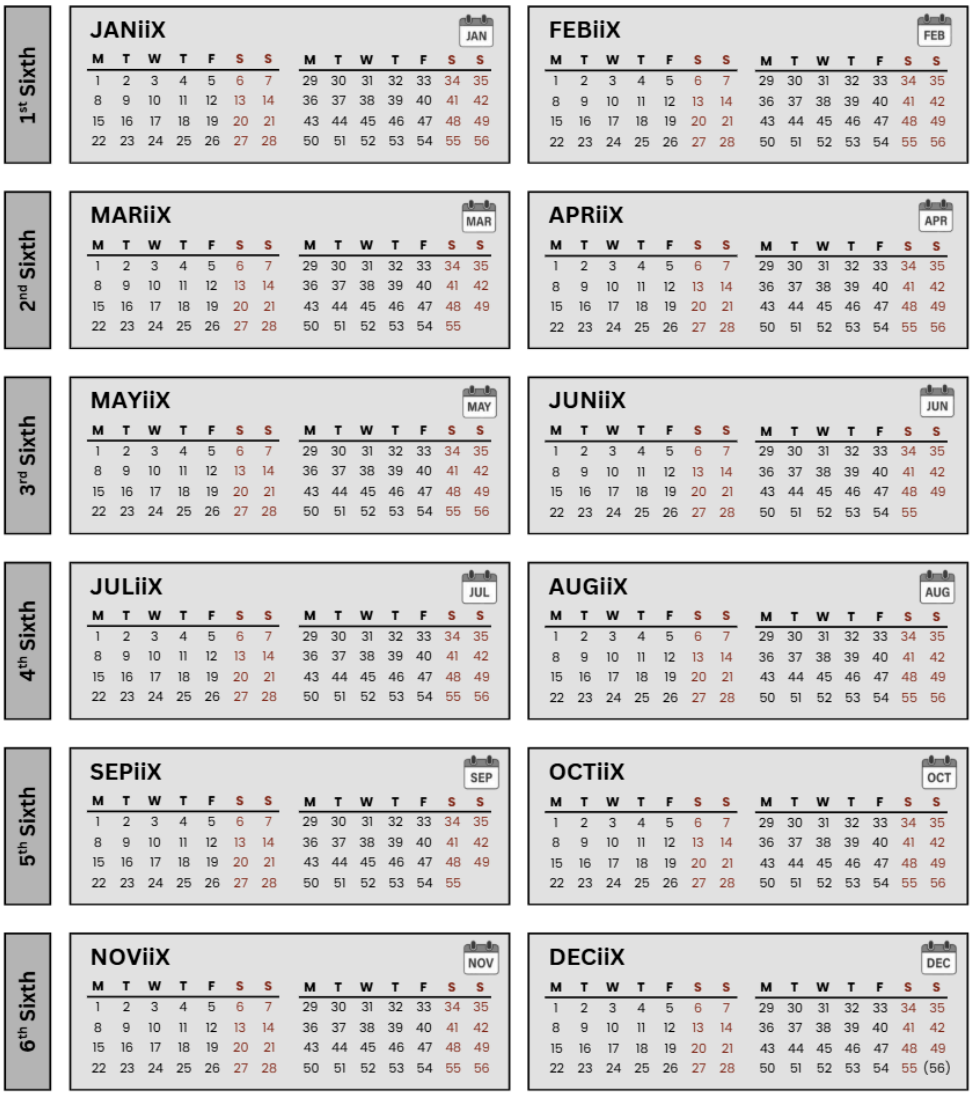

Calendar structure

- **Months**: **12 months** per year, grouped into four quarters of three months each, and six sixths of two months each.
    - **Length pattern**: Most months are **56 sols**. Months **3, 6, and 9** are **55 sols**. Month **12** has **55 sols** in common years and **56 sols** in leap years.
    - This gives **668 sols** in common years and **669 sols** in leap years.
- **Weeks**: A **seven-sol week** with weekday names **Monsol, Tuesol, Wedsol, Thursol, Frisol, Satsol, Sunsol**.

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Week alignment rule

To ensure that **every month begins on Monsol**, the calendar employs a controlled **weekday omission**:

- In months **3, 6, and 9**, and additionally in **month 12 of common years**, **Sunsol** (the 7th weekday) is omitted once at month-end.
- The omission is a *civil* adjustment ("outside the weekly count") that keeps month-starts aligned without changing the total number of dated sols in the month.

This preserves an intuitive monthly rhythm (each month opens on Monsol) while keeping the seven-day work/rest cadence intact across the year.

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Intercalation (leap-year) system

- **Base rule (decadal)**: In each **10-year** cycle, **six** years are leap years of **669 sols** and **four** are common years of **668 sols**.
    - A convenient expression is: **any odd-numbered year, or any year divisible by 10, is a leap year** (→ 6 leap years per decade).
    - **Placement of the extra sol**: always added to **month 12**, keeping all prior month/day patterns stable.
- **Average year length**: **668.6 sols**, close to the tropical value (**668.5907 sols**).
- **Long-cycle stability (drift control)**: To bound long-term seasonal drift, the system allows **epochal corrections** without affecting monthly structure:
    - **Century correction**: In centuries designated by civil statute (e.g., every 100th year), **omit one leap** within the century so that each **100-year block has 59 leap years** (mean **≈ 668.59 sols**).
    - **Great-cycle correction**: Add a single compensating **extra leap** roughly every **1 400 years** (policy-defined) to keep cumulative drift within a **sub-sol per multi-millennium** tolerance.
    - These corrections are silent to everyday users and keep the year's start near Ls 0° across eras.

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Epoch and compatibility with scientific dating

- **Human Era (HE)**: Year 0 HE = first human landing on Mars. Positive integers count forward; negative years (BHE) count backward.
- **Mars Year (MY) mapping**: For scientific compatibility, MY numbering (e.g., **MY 1 ≈ 11 April 1955** Earth date) is retained for almanacs; deterministic **HE↔MY** conversion tables are part of the standard.

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Naming conventions

- **Months**: A practical, Earth-familiar set adapted for Mars, e.g., **Janiix, Febiix, Mariix, Apriix, Mayiix, Juniix, Juliix, Augiix, Sepiix, Octiix, Noviix, Deciix**. The **"-iix"** suffix cues the **8-week** internal structure of a 56-sol month.
- **Weekdays**: As listed above, "**-sol**" replaces "-day" to reflect the Martian solar cycle.
- Names are conventional rather than prescriptive; some communities adopt variants while retaining the same **month lengths, week structure, and intercalation**.

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Zodiac and orbital reference

A **Martian zodiac** is optionally defined by the constellation at **northern vernal equinox** (planet-centric view) and proceeds in **30° segments of true anomaly** across the year. Almanacs also mark **perihelion, aphelion, equinoxes, solstices**, and other orbital points relevant to season, navigation, and cultural observances.

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Stability and drift tolerance

The combination of **6 leaps/decade**, **century tuning** (59 leaps/century), and **rare great-cycle corrections** keeps the calendar within a **tight seasonal envelope** while avoiding complex recurring rules in everyday life. The policy goal is **sub-sol drift across many millennia** without disrupting civil usage.

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Proleptic and postleptic use

- **Proleptic**: Applicable to pre-settlement history, simulation, and mission planning.
- **Postleptic**: Intended for civil governance, operations, festivals, education, and inter-settlement coordination.

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Digital and civil implementation

- **Public time systems**: Colony clocks, work shifts, and civil records use Marian dates/times.
- **Interoperability**: Software libraries provide **Earth↔Mars** conversions (e.g., via Julian-Date-based offsets, Mars Sol Date, and MY/HE bridges).
- **Almanacs**: Standard tables include **Phobos/Deimos** events, seasonal markers, and leap-year listings.
- **Localization**: Settlements may add local observances while sharing the same **global backbone** (months, weeks, leap pattern, epoch).

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Example year (common vs. leap)

- **Common year (668 sols)**
    - Month lengths: 56, 56, **55**, 56, 56, **55**, 56, 56, **55**, 56, 56, **55**

    - **Weekday omission (Sunsol)** at end of months **3, 6, 9, 12** to start each subsequent month on **Monsol**.

- **Leap year (669 sols)**
    - Month lengths: 56, 56, **55**, 56, 56, **55**, 56, 56, **55**, 56, 56, **56**
    - **Weekday omission** at end of months **3, 6, 9** (month 12 gains the leap sol).

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Minths (half-months)

Definition. A **minth** is a half-month subdivision of the Marian calendar used for planning, record-keeping, and cultural observances. There are **24 minths per Marian year**, each tied to a fixed position within a civil month. Minths make week-to-week work cadence legible at a finer grain without abandoning the 12-month frame.

Lengths.

- In a **56-sol month**: two minths of **28 sols** each.
- In a **55-sol month**: by convention the **first minth has 28 sols** and the second **27 sols** (to preserve stable month starts and reporting cycles).

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Minths catalogue and mapping to sixths

A **sixth** is a two-month operational block; each sixth contains **4 minths**. This yields **6 sixths × 4 minths = 24 minths**.

Here's the **Minths (A–X) standard catalogue**, with each entry showing: **Quarter • Sixth • Month (half) • Length • Ls midpoint • Mandarin alias (gloss)**. **Ls midpoints** are approximate; Mars's orbital eccentricity means equal-Ls spans cover unequal numbers of sols.

Primus • Sixth I

- **A — Aurex** — *Janex (H1) • 28 sols • Ls ≈ 280°* • **Aihan**
- **B — Borox** — *Janox (H2) • 28 sols • Ls ≈ 305°* • **Bahan**
- **C — Cerex** — *Febex (H1) • 28 sols • Ls ≈ 310°* • **Chunli**
- **D — Dorox** — *Febox (H2) • 28 sols • Ls ≈ 325°* • **Dushui**

Secondus • Sixth II

- **E — Epex** — *Marex (H1) • 28 sols • Ls ≈ 340°* • **Ezhe**
- **F — Furax** — *Mar**a**x (H2)* • ***27 sols*** *• Ls ≈ 355°* • **Fenhua**
- **G — Garex** — *Aprex (H1) • 28 sols • Ls ≈ 10°* • **Guanming**
- **H — Herox** — *Aprox (H2) • 28 sols • Ls ≈ 25°* • **Huyu**

Tertus • Sixth III

- **I — Itrex** — *Mayex (H1) • 28 sols • Ls ≈ 40°* • **Ignixia**

- **J — Jorox** — *Mayox (H2) • 28 sols • Ls ≈ 55°* • **Jiman**
- **K — Korex** — *Junex (H1) • 28 sols • Ls ≈ 70°* • **Kangzhong**
- **L — Larax** — *Juna**x** (H2)* • ***27 sols*** *• Ls ≈ 85°* • **Luxia**

Quartus • Sixth IV

- **M — Marex** — *Julex (H1) • 28 sols • Ls ≈ 100°* • **Mushu**
- **N — Norox** — *Julox (H2) • 28 sols • Ls ≈ 115°* • **Nushu**
- **O — Orex** — *Augex (H1) • 28 sols • Ls ≈ 130°* • **Oqiu**
- **P — Parox** — *Augox (H2) • 28 sols • Ls ≈ 145°* • **Pushu**

Quintus • Sixth V

- **Q — Qorex** — *Sepex (H1) • 28 sols • Ls ≈ 160°* • **Qilou**
- **R — Rilax** — *Sep**a**x (H2)* • ***27 sols*** *• Ls ≈ 175°* • **Runfen**
- **S — Sarex** — *Octex (H1) • 28 sols • Ls ≈ 190°* • **Silu**
- **T — Torox** — *Octox (H2) • 28 sols • Ls ≈ 205°* • **Tongjiang**

Sextus • Sixth VI

- **U — Urex** — *Novex (H1) • 28 sols • Ls ≈ 220°* • **Undong**
- **V — Varox** — *Novox (H2) • 28 sols • Ls ≈ 235°* • **Vaxue**
- **W — Warex** — *Decex (H1) • 28 sols • Ls ≈ 250°* • **Wanxue**
- **X — Xenax** — *Dec**a**x (H2)* • ***27 sols (common)*** */* ***28 sols (leap)*** *• Ls ≈ 265°* • **Xianzhi**

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Mandarin Minths (jiéqì-aligned aliases)

To support a cross-cultural seasonal intuition, each minth also carries a **Mandarin alias** aligned to the spirit and order of the **24 jiéqì** (solar terms). The aliases follow the traditional sequence (planet-centric, by solar longitude **Ls**), while retaining the A–X index for interoperability. This layer is **descriptive** (for almanacs, education, and ritual) and does not alter civil month boundaries.

Key: A–X index → **Standard pinyin** (English gloss) — *typical Ls window on Mars, by analogy*
(On Mars, Ls advances unevenly in sols; aliases reference the nearest Ls midpoint, not exact sol counts.)

Quarter groupings. The 24 minths are grouped into four seasonal quarters reflecting lived rhythms:

- **Primiv** (A–F): emergence
- **Secondiv** (G–L): activity
- **Tertiv** (M–R): transition
- **Quartiv** (S–X): restoration

New Pinyin	Original Jiéqì	Root Echo	Construction Notes

A	**Aihan**	小寒 (*Xiǎohán*) – Minor Cold	寒 = cold	A (initial) + *hán* = evokes "early cold" (fitting start of year)
B	**Bahan**	大寒 (*Dàhán*) – Major Cold	寒 = cold	B + *hán* = bloom amid harsh cold, poetic tension
C	**Chunli**	立春 (*Lìchūn*) – Spring Begins	春 = spring, 立 = begin	Inverted order to sound elegant; still clearly linked to "spring beginning"
D	**Dushui**	雨水 (*Yǔshuǐ*) – Rain Water	水 = water	Du = dew + *shuǐ* = gentle moisture, soft rain
E	**Ezhe**	惊蛰 (*Jīngzhé*) – Awakening of Insects	蛰 = hibernating insect	*E* merges with *zhé* = evoke emergence, stirrings of life
F	**Fenhua**	春分 (*Chūnfēn*) – Spring Equinox	分 = divide, balance	*Fen* = balance, *hua* = blossom; harmony in growth
G	**Guanming**	清明 (*Qīngmíng*) – Clear and Bright	明 = brightness	*Guan* = viewing/light, *ming* = clarity; vision, enlightenment
H	**Huyu**	谷雨 (*Gǔyǔ*) – Grain Rain	雨 = rain	*Hu* = humidity, *yǔ* = rain; steamy fertile rainfall
I	**Ignixia**	立夏 (*Lìxià*) – Summer Begins	夏 = summer	*Igni* = ignite + *xia* = summer; start of heat and energy
J	**Jiman**	小满 (*Xiǎomǎn*) – Grain Full	满 = full	*Ji* (like jet) + *mǎn* = bursting with growth
K	**Kangzhong**	芒种 (*Mángzhòng*) – Grain in Ear	种 = to sow	*Kang* = kindle or spark, *zhong* = planting; sowing heat
L	**Luxia**	夏至 (*Xiàzhì*) – Summer Solstice	夏 = summer	*Lu* = light/lux, *xia* = summer; radiant high point
M	**Mushu**	小暑 (*Xiǎoshǔ*) – Minor Heat	暑 = heat	*Mu* = magnitude, *shu* = heat; rise in temperature
N	**Nushu**	大暑 (*Dàshǔ*) – Major Heat	暑 = heat	*Nu* = nudge/turning point, *shu* = heat; peak tipping point
O	**Oqiu**	立秋 (*Lìqiū*) – Autumn Begins	秋 = autumn	*O* = opulence + *qiu* = autumn; ripe abundance
P	**Pushu**	处暑 (*Chǔshǔ*) – Limit of Heat	暑 = heat	*Pu* = pause, *shu* = heat; calming of intensity
Q	**Qilou**	白露 (*Báilù*) – White Dew	露 = dew	*Qi* = quest, *lou/lù* = dew; searching stillness
R	**Runfen**	秋分 (*Qiūfēn*) – Autumn Equinox	分 = divide	*Run* = reflect, *fen* = balance; inward contemplation
S	**Silu**	寒露 (*Hánlù*) – Cold Dew	露 = dew	*Si* = still/shelter, *lu* = dew; serene shelter

T	**Tongjiang**	霜降 (*Shuāngjiàng*) – Frost Descent	霜 = frost	*Tong* = threnody, *jiang* = descent; poetic fall into frost
U	**Undong**	立冬 (*Lìdōng*) – Winter Begins	冬 = winter	*Un* = umbra, *dong* = winter; shadow-turn of season
V	**Vaxue**	小雪 (*Xiǎoxuě*) – Minor Snow	雪 = snow	*Va* = Velcro metaphor, *xue* = snow; adherence, seal
W	**Wanxue**	大雪 (*Dàxuě*) – Major Snow	雪 = snow	*Wan* = waning/winter, *xue* = snow; snow at fullness
X	**Xianzhi**	冬至 (*Dōngzhì*) – Winter Solstice	至 = arrival	*Xian* = strange/alien, *zhi* = arrival/utmost; renewal via cosmic stillness

Usage. Almanacs and school charts often show **both** layers side-by-side: the **civil A–X minth** (e.g., *C · [Aurex-series name]*) and its **Mandarin alias** (e.g., *Jīngzhé*), plus the containing **sixth** (e.g., **Sixth I**). This tri-labeling helps settlers coordinate operations while building shared seasonal literacy on Mars.

Retrospective Logic of Design

The Marian calendar is best understood not as an invention but as a convergence in the first hundred years of settlement (late 21st century AD): a minimal set of civil choices layered atop scientific timekeeping, each selected because crews, families, and institutions found them predictable, interoperable, and, above all, livable.

The step-by-step logic ultimately was:

1. **Prime meridian at Airy-0** gave a universal spatial "zero" for timekeeping; nothing else could proceed without it.
2. **Long-second 24:60:60** preserved human intuition and reduced cognitive and technical switching costs; dual-track (SI + civil) timing bridged science and society.
3. **New Year at Ls = 280°** balanced astronomical stability with an operationally convenient seam and avoided over-identifying New Year with one hemisphere's spring, and synchronized with Earth.
4. **Human Era epoch (Year 0 = first landing)** anchored civil memory; science retained MY/Ls/MSD, with formal conversion between systems.
5. **12-month civil architecture** (mostly 56-sol months; selective 55-sol months; extra sol in Month 12) produced a legible year; **seven-sol week** with a **Sunsol omission rule** made every month begin on **Monsol** without breaking communities that needed a continuous seven.
6. **Names** were light-touch and learnable (-iix months, Monsol…Sunsol), with localization permitted so long as the backbone remained intact.
7. **Minths (A–X) and Sixths (I–VI)** exposed the planning granularity operators used, while almanacs kept the **Ls** layer visible for season and science.
8. **Drift controls** (6/decade leaps + century/millennial tunings) held the calendar close to the vernal-equinox year for millennia without monthly surprises.

It approached each of these steps with a Muskian design philosophy. Firstly, prior to the mid-21st century most Martian calendar designers were using a "very dumb set of requirements" to begin with. Next they all added complexity and features to the existing baseline of humanity's Gregorian calendar, rather than try to delete parts of it and simplify further fixing obvious legacy oddities (e.g. odd length months, leap days in strange places, etc). Finally they spent time seeking to optimize what was left. The Marian calendar went back to first principles and started against a different set of requirements, from there deleted and optimized parts of the existing "calendar wheel" against the new constraints, and that included things like the approach to naming months and sols so that every month-date had a consistent week-sol across years.

Diving deeper into each of these:

1) Fixing where "zero" is: the prime meridian

The precondition for any shared time (and therefore any calendar) is a shared "where" on the planet. Mars's prime meridian was established in the 19th century and later refined to the crater **Airy-0**, which became the origin for longitude and for mean solar time at the meridian. With Airy-0 accepted across the scientific community, subsequent civil standards could inherit a single reference without reopening cartographic debates.

Why this matters for a calendar.

- A civil day boundary (midnight at a reference meridian) and a planet-wide reference time (the Mars analogue of UT/UTC) both lean on a fixed prime meridian.
- Operational clocks for navigation, communications passes, and power scheduling need a **global reference** even if local settlements shift working hours for convenience.

Alternatives considered (not adopted).

- **Floating or multi-prime standards** (e.g., per-hemisphere "zeros"): rejected as unhelpful for inter-settlement coordination.
- **Ephemeris-only time** (counting sols from an epoch with no fixed meridian): sufficient for science, but not for everyday civil use.

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2) Agreeing on the "long-second" 24:60:60 day

By the Viking era, practice converged on a **24 hours × 60 minutes × 60 seconds** division of the Martian **solar day (sol)**, with each unit stretched by ~2.75% relative to Earth. This kept clocks familiar while matching the sol's true length (≈ 24 h 39 m 35 s of Earth time). The decision — made by use before statute — proved extraordinarily sticky: it allowed humans to carry their intuition for hours and weeks onto a new world with minimal cognitive friction.

Merits.

- **Human-factor continuity:** "eight hours of sleep," "a one-hour meeting," "a 30-minute EVA prep" continue to mean what they feel like, not just numbers on a display.
- **Technical interop:** Software, displays, and procedures can be ported with proportional scaling rather than rewritten for decimal or non-sexagesimal schemes.

Alternatives considered (not adopted).

- **SI-second sol** (keep seconds fixed, redefine hours/minutes non-sexagesimally): technically pure, ergonomically brittle.
- **Decimal time** (10×100×100): attractive on paper, historically fragile on Earth; offered no decisive benefit on Mars.
- **Dual clocks** (Earth seconds for instruments, civil "long seconds" for people): adopted informally anyway, but the **civil** clock had to be singular, and that was the stretched 24:60:60.

Mitigation for edge cases. Scientific logs and instruments often recorded in SI seconds plus Mars Sol Date (MSD); civil records tracked long-second clock time. Conversion libraries bridged the two.

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3) Selecting Ls = 280° as New Year

New Year needed a planet-shared anchor in Mars's orbit: the **solar longitude (Ls)** at which Year Day is defined. Many proposals favored **Ls = 0°** (northern vernal equinox) by analogy with terrestrial traditions; others chose **Ls = 270°** (northern winter solstice), **Ls ≈ 251°** (perihelion), or **Ls = 90°/180°** (solstice/equinox symmetry).

The Marian calendar fixed **Year Day at Ls = 280°** — ten degrees after the northern winter solstice, early in northern late-winter/southern late-summer.

Reasons for the Ls = 280° choice.

- **Operational seam:** The window just after the northern winter solstice sits between major seasonal peaks in atmospheric variability; for many mid-latitude sites this made a practical "book-closing" moment after dust-season complexities.
- **Clear separation from perihelion:** Perihelion (≈ Ls 251°) is operationally busy; beginning the year slightly after avoids binding New Year to the most thermally and meteorologically distinctive period.
- **Cultural synchronization without imitation:** Earth's January 1 is not an equinox or solstice either; Ls = 280° provided a **stable post-solstice marker** that felt analogous, aligned without copying and still providing an Earth independent baseline. Synchronization enables cultural alignment both-ways across planets.
- **Stability across epochs:** The vernal-equinox year and the winter-solstice year are both relatively stable on Mars; placing New Year close to, but not exactly at, the solstice balanced astronomical neatness with operational convenience.

Leading alternatives (and why they were not chosen).

- **Ls = 0° (northern vernal equinox):** Popular, simple, and common in science; ultimately set aside to avoid over-identifying New Year with one hemisphere's spring and to gain the operational seam noted above.
- **Ls = 270° (northern winter solstice):** Clean symmetry, but too tightly coupled to dust-season crest and perihelion-adjacent operations.
- **Ls ≈ 251° (perihelion):** Physical elegance, poor human factors; seasons on Mars are driven by both obliquity and eccentricity, but people live by light/weather cues more than by orbital anomaly.
- **Ls = 90°/180° (other solstice/equinox):** No compelling human or operational advantage over 280°, and they re-centered year start on strong hemispheric metaphors.

Mitigations of issues with this solution. Scientific almanacs continued to index seasons by **Ls**, and agencies published **conversion tables** so that "Marian New Year" and "Ls=0° (vernal equinox)" remained easy to compare.

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<u>4) Choosing the epoch (what counts as Year 0/1)</u>

Picking the **epoch** is a social decision more than a physical one. Options canvassed included: the **Viking 1** landing (1976), the **Kepler/Galileo 1609** scholarly epoch, the **MSD/MTC** epoch (1873-12-29), **MY 1** (1955-04-11), and the **first human landing**.

The Marian calendar adopted a **Human Era (HE)**: **Year 0 HE = first human landing on Mars**, with **BHE** ("Before Human Era") for prior years. Scientific practice retained Mars Year (MY) for research chronology, and the appendix standards include a deterministic **HE↔MY↔JD** mapping.

Reasons for the Human Era epoch.

- **Civil relevance:** A civil calendar marks civic history; the first landing is the obvious hinge for public memory.
- **Conversion discipline:** Settlements relied on software layers to translate HE dates to MY and Julian systems; once established, this added no daily friction.
- **Negative-date avoidance:** With Year 0 at the landing, most living memory runs in positive HE years; deeper history uses BHE, which is culturally legible.

Leading alternatives (and why they were not chosen).

- **Viking 1 landing (1976):** Powerful scientific milestone but not a lived civil hinge for settlers.
- **MSD epoch (1873-12-29):** Excellent for computation; opaque to citizens.
- **MY 1 (1955-04-11):** Ubiquitous in research; too specialized as a civil epoch.
- **1609 scholarly epoch:** Elegant symbolism, too remote; yields large positive year numbers with little intuitive meaning.

Mitigations. The code-level truth remained plural: **HE** for civil life, **MY/Ls/MSD** for science and operations, with robust round-trip conversion. Calendars in schools taught both.

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5) Dividing the year: months, weeks, and leap years

With New Year and epoch in hand, the remaining question was how to structure the **≈ 668.5907-sol** tropical year for human planning, building and operations.

The Marian solution.

- **Months: 12 months** grouped into four seasons of three months each. Most months are **56 sols**; months **3, 6, 9** have **55 sols**; month **12** has **55 sols** in common years and **56 sols** in leap years.
- **Weeks:** A **seven-sol week** (**Monsol, Tuesol, Wednesol, Thursol, Frisol, Satsol, Sunsol**), synchronized globally.
- **Week–month alignment rule:** Every month **begins on Monsol**. To achieve this, **Sunsol is omitted once** at the **end** of months **3, 6, 9**, and also at the **end of month 12** in common years. (The omission is a civil convention; religious or labor-law accounting may still count continuous sevens.)
- **Leap-year cycle: Six leap years per decade**: **every odd-numbered year, plus years divisible by 10**. The extra sol is **always added to month 12**. This yields a mean of **668.6 sols**, close to the vernal-equinox year.
- **Long-cycle stability:** Century and great-cycle tunings (e.g., **59 leaps per 100 years**, with rare millennial adjustments) keep cumulative drift within a **sub-sol over many millennia** tolerance—implemented as institutional almanac rules, invisible to daily life.

Why this pattern.

- **Human legibility:** Twelve is familiar; quarters and seasons stay comprehensible; most months present the same internal cadence (8 weeks in a 56-sol month).
- **Operational regularity:** Fixed month starts (always Monsol) simplify rosters, invoicing, and statutory deadlines.
- **Intercalation simplicity:** “Extra sol in Month 12” isolates complexity to year-end; upstream dates don’t move.

Leading alternatives (and why they were not chosen).

- **24-month schemes** (e.g., Darian; 20×28 + 4×27 with orderly leap sols): elegant symmetry, but doubled month count complicated civil administration and muddied quartering for finance and law.
- **24×28 with "leap week" deletions** (e.g., Šurán): beautifully uniform months; leap-week omissions at year-end proved culturally and legally awkward for payroll, benefits, and audit trails.
- **18-month schemes** (e.g., Moore): plausible compromise, but offered no compelling advantage over 12 for public literacy and cross-cultural adoption.
- **Floating weeks** (e.g., Gregorian-style): familiar to Earth, but forfeited the "every month begins on Monsol" clarity that settlers prized for planning.

Mitigations for week-sensitive communities. Where a continuous seven-sol observance mattered, communities kept an **unbroken count** parallel to the civil omission rule; civil service portals could display both.

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6) Naming the parts (without overfitting culture)

Names were layered, not imposed. The calendar kept Earth-familiar cues while signaling a new world:

- **Months: Janiix, Febiix, Mariix, Apriix, Mayiix, Juniix, Juliix, Augiix, Sepiix, Octiix, Noviix, Deciix.** The "**-iix**" suffix mnemonically marks the prevalent **8-week** cadence of the 56-sol month.
- **Weekdays: Monsol … Sunsol**, using the English stems with a planetary "sol" ending (local language equivalents coexisted).
- **Seasonal layer (optional):** Almanacs reference **Ls** markers (solstices/equinoxes, perihelion/aphelion) and recognize a **Mandarin alias set** for the 24 sub-monthly markers (see minths below), by analogy with Earth's **jiéqì** without importing its climate claims.

Naming alternatives (and why they were not frozen).

- **Entirely novel lexicons:** charming but polarizing and complex; the standard adopted a minimal layer and left room for local custom.
- **Full classical/Latinization:** internally consistent, externally opaque; the chosen mix favored memorability and ease of learning.
- **Phobos/Deimos month names:** astronomical poetry, but misleading about their role (the moons do not define Martian months).

Mitigations. The standard is descriptive, not prescriptive: month lengths, week rules, and intercalation are fixed; **labels can be localized** so long as the structural backbone remains intact.

Note: As the naming here was not "owned" or "authored" by anyone in particular, the proposal was ultimately more acceptable to everyone. This point is often understated in historic reviews.

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7) Sub-monthly scaffolding (minths and sixths)

Experience showed that teams planned in **2- to 8-week** horizons (~10 to ~100 sleep cycles). The calendar therefore exposes two sub-monthly units that settled naturally into use:

- **Sixths: Six two-month blocks** (**I–VI**), each containing **~112 sols** (four minths). “Sixths” matched how operations, budgets, and educational terms often ran in practice — longer than a month, shorter than a season.
- **Minths: “Mini-Months”, 24 half-months** per year. In a 56-sol month, minths are **28 sols** each; in a 55-sol month, the **first** minth is 28 and the **second** is 27 (preserving stable month starts). Each minth has a canonical **A–X** index (**Aurex … Xenax**) and an optional **Mandarin alias** aligned to the spirit/order of the 24 **jiéqì**.

Why these, not others.

- **Cadence fit:** They matched how people naturally grouped work, review cadences, and maintenance cycles.
- **Data aggregation:** Public metrics (safety, energy, finance) reported cleanly by minth and sixth without bespoke custom periods.

Time standards and zones

- **Reference time: ATC** (Airy Coordinated Time) at **Airy-0** serves as the planetary backbone; local zones in ~15° longitude bands give settlements clock-time convenience.
- **Conversion stack: HE** (civil) ↔ **MY/Ls/MSD** (science/ops) conversions are standard library functions; civil tools display both by default when context warrants.

Stability and drift tolerance

- **Mean alignment:** 6-per-decade leaps keep the average year at **668.6 sols**; century and great-cycle tunings bound residual drift.
- **Visibility:** Adjustments are almanac-level (like Earth’s leap-second notices), not month-level surprises; the extra sol always lands in **Month 12**.

Records, law, and education

- **Records:** Statutes define deadlines and fiscal boundaries by **month/minth**, not by Ls, while government almanacs maintain the Ls correlation table.
- **Education:** Early curricula teach **dual literacy** (civil HE dates and scientific Ls/MY) so citizens can read both civic and scientific timelines with ease.

Why this logic, and why no calendar was adopted earlier?

The logic of the Marian calendar is procedural: first fix **where** you measure from (meridian), then **how** you divide the sol (long-second 24:60:60), then **when** the year begins (Ls = 280°), then **what** event all years count from (epoch), and only then **how** to package the year for human life (months, weeks, leaps, names, and sub-monthly scaffolding). In hindsight, two points are clear:

1. **A civil calendar could not be reliably finalized before settlement.** The scientific prerequisites (meridian, clock) were mature by the 1970s, but everything genuinely “civil”— year start practicality, epoch legitimacy, week–month ergonomics, naming tolerance, and sub-monthly cadence — required lived experience on Mars. The right answers were not discoverable in committee alone, certainly not one based on Earth.

2. **Most alternatives failed not on astronomy but on sociology.** The leading non-adopted schemes were elegant on paper yet mismatched to how humans budget, staff, repair, and celebrate. The Marian choices are not “pure” in any absolute sense; they are the ones that **survived contact with habitation**.